

A MOBILE RING CONNECTING/RELEASE DEVICE, IN PARTICULAR FOR A HIGH MAST

TECHNICAL FIELD AND BACKGROUND ART.

5 The present invention relates to a mobile ring connecting/release device, in particular for a high mast with a tower with predetermined height and a fixed supporting head at one end of the tower. The device is of the type comprising connecting means  
10 attached to the mobile ring and operating on the supporting head to removably connect the mobile ring to the supporting head.

As is known, high masts are used to support various apparatus, such as floodlights, lighting systems  
15 and/or advertising signs and consist of a pole or tower with predetermined height, normally made of pressed - folded sheet steel, longitudinally welded and galvanised.

At the top of the pole there is a winching and  
20 supporting head for a mobile ring which runs along the tower and supports the above-mentioned apparatus.

High masts may be divided into two main categories, according to the type of mobile ring movement:

25 - high mast with counterweight movement with cables

constantly under tension;

- high mast with winch movement, manual or electric, with cable release.

5 On the former type of high mast, the mobile ring is raised and held in position using counterweights and safety locks.

Such movement is now almost obsolete for safety reasons and due to the considerable operating costs. In accordance with the safety standards in  
10 force, high masts with mobile rings held in position by cables which are constantly under tension are considered equivalent to lifts or elevators as regards their maintenance and aspects linked to safety.

15 The latter type of high mast normally has a supporting and winching head consisting of three arms set at 120° to one another.

Inside each arm there is a plurality of pulleys, on which a traction cable runs, normally made of  
20 stainless steel or galvanised steel, which may be coated with PVC.

The size of the pulleys in each arm must be such that they guarantee large cable curvature radii, to prevent noticeable bending or angles which could  
25 prevent correct mobile ring lifting.

This type of high mast has three cables running inside the tower and resting on at least the same number of pulleys installed on each of the supporting head arms.

5 The cables have a first end connected to the mobile ring and a second end connected to the top of a distributor (also mobile inside the tower) which allows extremely precise adjustment of cable tension and their stable separation, preventing any  
10 twisting.

The bottom of the distributor is connected to a steel chain kinematically connected to a winch driven by an electric motor, which allows movement of the mobile ring, both up and down.

15 At present, to overcome the disadvantage of cables constantly under tension, a connecting device is used with flexible connecting rods made of harmonic steel and fixed to the mobile ring.

During the mobile ring upstroke, the connecting  
20 rods are forced to bend and turn due to the presence of seats made in the supporting head. Said seats are substantially U-shaped and their size is such that they receive the connecting rods.

The mobile ring continues its upstroke to allow the  
25 connecting rods to go beyond the vertical sides of

the seats then moves downwards again to allow insertion of the connecting rods in a housing formed by said vertical sides (each connecting rod is vertically inserted in a corresponding "U" forming a seat).

Vice versa, during lowering, the mobile ring first covers a short upward distance to allow the connecting rods to bend and turn, disengaging from the above-mentioned seats, then begins its downstroke.

Basically, the mobile ring hangs from the fixed supporting head by means of a plurality of connecting rods which are vertically inserted in corresponding seats.

The connecting device briefly described above has the important disadvantage of being subject to extreme stress by the static load of the mobile ring, which is often more than 2000 kg.

In particular, given the size of the pulleys inside the arms and the need to provide sufficient elasticity in order to allow connection in/release from the seats, the connecting rods are very small and, therefore, subject to very high levels of stress.

Moreover, given the configuration of the seats, the

connecting rods substantially bear the load on their tips and so are particularly subject to load instability and breakage.

#### DISCLOSURE OF THE INVENTION.

5 The aim of the present invention is to overcome the above-mentioned disadvantages by proposing an extremely strong mobile ring connecting/release device, in particular for a high mast.

Another aim of the present invention is to provide  
10 a connecting/release device which allows easy connection/release of the mobile ring to/from the fixed supporting head.

A further aim of the present invention is to achieve the above-mentioned results with a simple,  
15 rational and reliable solution.

These aims are fulfilled by the mobile ring connecting/release device, in particular for a high mast, disclosed, as described in the claims herein and in particular characterised in that the  
20 connecting means comprise rigid contact elements shaped in such a way that they rest on corresponding contact portions of the supporting head.

#### BEST MODE FOR CARRYING OUT OF THE INVENTION.

25 This and other characteristics are more clearly

illustrated in the description which follows, with reference to the accompanying drawings, which illustrate a preferred embodiment of the invention without limiting the scope of the inventive concept, and in which:

- Figure 1a is an overall view of a mobile ring connected to a fixed supporting head;
- Figure 1b is an enlarged view of a construction detail of the mobile ring illustrated in Figure 1;
- Figures 2a, 2b, 2c and 2d illustrate a first embodiment of a connecting/release device made in accordance with the present invention, in four different operating positions;
- Figures 3a, 3b, 3c and 3d illustrate a second embodiment of a connecting/release device made in accordance with the present invention, in four different operating positions.

With reference in particular to Figure 1, a mobile ring for a high mast is labelled with the numeral 1 and supports a plurality of floodlights 2.

Figure 1 also illustrates, again by way of example only, a fixed supporting head 3, with three arms 4 set at 120° to one another.

At the point of intersection of the three arms 4 there is a housing 5 needed to fix the supporting

head 3 at one end of a tower with predetermined height (not illustrated).

With reference to Figure 1b, inside each arm 4 there is preferably at least one pair of pulleys 6, on which a cable 7 runs, the cable normally made of stainless steel or galvanised steel, with a first end 7a fixed to the mobile ring 1 and a second end fixed to a distributor (of the known type and not illustrated) which is mobile inside the tower.

In particular, with reference to Figures 2a to 2d, the mobile ring connecting/release device disclosed is labelled 8 as a whole.

The device 8 comprises connecting means attached to the mobile ring 1 for removably connecting it to the fixed supporting head 3.

In an original way, the connecting means comprise rigid contact elements 9, shaped in such a way that they rest on corresponding contact portions 10 of the supporting head 3.

In the example illustrated in Figures 2a to 2d, the contact elements 9 are substantially trapezoidal and are rotatably fixed on corresponding mobile ring 1 uprights 11, preferably by a single pin 12.

The contact portions 10 form guides to allow the insertion of each mobile ring 1 upright 11 in the

fixed supporting head 3.

The device 8 comprises means for activating a rotation of each contact element 9 about an axis passing through the pin 12 and substantially perpendicular to a corresponding upright 11. This rotation is necessary to align each contact element with its upright and allow insertion of the latter in the guides.

In the preferred embodiment illustrated in Figures 2a to 2d, the means for activating the rotation comprise at least one pusher body 13 attached to the guides and at least one peg 14 fixed to the supporting head 3, both acting on a portion 9a of each contact element 9. In particular, the pusher body 13 consists of a metal plate with predetermined length.

The contact portions 10 have at least one substantially horizontal and flat surface 10a.

The contact elements 9 also have at least one substantially flat outer surface 9b, so that they can rest without gaps on the corresponding flat surface 10a of the contact portions 10.

Each contact element 9 is shaped in such a way that it is at an angle to a horizontal direction, in the home configuration.



Specifically, the angle of the contact elements is preferably achieved with a calibrated distribution of the weights, combined with a suitable choice of the point for fastening to the upright. In particular, the centre of gravity of each contact element must not be aligned with the pin 12, but must be located, relative to the latter, on the side on which the contact element is to be angled. In contrast to the technical solutions in prior art, the contact elements 9 do not bend in order to reach their position in the fixed head 3, but perform a simple rotation, remaining perfectly rigid. In this way, they guarantee extremely safe connection of the mobile ring 1 to the fixed supporting head. Specifically, the contact elements 9, in contrast to the connecting rods in the prior art, do not have to be small, since they do not need to be flexible. Therefore, the contact elements 9 can bear very high levels of stress. Figures 3a to 3d illustrate a second embodiment of a connecting/release device made in accordance with the present invention. The rigid contact elements 9 are substantially "P"-shaped and have an oblong portion 91 which is inserted in a special horizontal "U"-shaped seat

15, which forms contact portions 10.

Each contact element 9 is hinged to a corresponding mobile ring 1 upright 11 by a single pin 12.

5 The oblong portion 91 has a substantially horizontal and flat contact surface 91a, so that it can rest on a corresponding flat surface of the contact portions 10.

The invention operates as follows.

10 With reference to Figure 2a, during the mobile ring 1 upstroke towards the fixed supporting head 3, the portion 9a of the contact element 9 collides with the metal plate 13, causing the entire contact element to rotate about an axis passing through the pin 12. In this way, the contact element 9 is  
15 aligned with the upright 11 and can pass through the guides formed by the contact portions 10 (Figure 2a, top). Then (Figure 2b), the contact element 9, once freed from the action of the guides 10, returns to the almost horizontal position and,  
20 after a downward movement by the mobile ring 1, rests on the contact portions 10. In this way, the mobile ring is stably connected to the supporting head 3.

25 During the release step, the mobile ring 1 covers a short upward distance, until the portion 9a of the

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contact element 9 collides with the peg 14 (Figure 2c). This causes the contact element 9 to rotate, aligning it with the upright 11, so that it can pass through the guides 10.

5 Once the contact element 9 is aligned with the upright 11, the mobile ring 1 begins its downstroke (Figure 2d).

As regards the second embodiment of the invention, with reference to Figure 3a, the mobile ring 1  
10 begins the upstroke, causing the contact element 9 to rotate after the oblong portion 91 has made contact with the seat 15.

The mobile ring 1 continues the upstroke until the portion 91 reaches an opening in the seat 15.

15 Then (Figure 3b), the mobile ring 1 covers a short downward distance to allow insertion of the portion 91 in the seat 15 so that it rests against the contact portions 10.

During the release step, the mobile ring 1 covers a  
20 short upward distance, until the oblong portion 91 of the contact element 9 completely exits the seat 15 (Figure 3c).

Then, during the mobile ring downstroke, the contact element 9 rotates due to its collision with  
25 the seat 15 (Figure 3c) and, once it has passed the

zone in which it makes contact with the seat 15, returns to the home configuration which it was in during the upstroke (Figure 3d).

The present invention has important advantages.

5 Firstly, such a connecting/release device, in contrast to those in prior art, is extremely strong and is not subject to any load instability.

Secondly, such a connecting/release device allows easy connection/release of the mobile ring to/from  
10 the fixed supporting head.

Advantageously, the mobile ring, resting on surfaces rather than hanging, is subject to less oscillation, particularly in the presence of strong winds.

## CLAIMS

- 1) A mobile ring (1) connecting/release device (8), in particular for a high mast with a tower with predetermined height and a fixed supporting head (3) at one end of the tower, comprising connecting means attached to the mobile ring (1) in such a way as to removably connect it to the fixed supporting head (3), the connecting/release device being characterised in that the connecting means comprise rigid contact elements (9) shaped in such a way that they rest on corresponding supporting head (3) contact portions (10).
- 2) The device according to claim 1, characterised in that each contact element (9) is rotatably fixed on a corresponding mobile ring (1) upright (11).
- 3) The device according to claim 2, characterised in that each of the contact elements (9) is shaped in such a way that it is at an angle to a horizontal direction, in the home configuration.
- 4) The device according to claim 2, characterised in that the contact portions (10) form guides for insertion of the mobile ring (1) upright (11) in the fixed supporting head (3).
- 5) The device according to claim 4, characterised in that the fixed supporting head (3) comprises means

for activating a rotation of a contact element (9) about an axis substantially perpendicular to a mobile ring (1) upright (11), for aligning the contact element (9) with the upright (11) and allowing insertion of the latter in the guides (10).

- 6) The device according to claim 5, characterised in that the means for activating the rotation comprise at least one pusher body (13) connected to the guides (10) and/or at least one peg (14) fixed to the supporting head (3), both acting on a portion (9a) of a contact element (9).
- 7) The device according to claim 2, characterised in that each contact element (9) is fixed on a corresponding mobile ring (1) upright (11) by means of a single pin (12).
- 8) The device according to claim 1, characterised in that the contact portions (10) have at least one substantially horizontal and flat surface (10a).
- 9) The device according to claim 8, characterised in that the contact elements (9) have at least one substantially flat outer surface (9a; 91a), allowing them to rest without gaps on the corresponding flat surface (10a) of the contact portions (10).



